brighter than the latter. In the telescope the color was a bright rose-pink.

The head of the cloud immediately after its formation was in α 11^h 10^m and $\delta + 24°$. At 14^h 13^m the same part of the cloud occupied the position α 11^h 0^m and $\delta + 16°$. The cloud was still plainly visible, although much fainter, at 14^h 29^m, 42 minutes after the fall of the meteor.

At 14^h 37^m $18^s \pm 5^s$ another bright *Leonid* fell near the eastern horizon. There was considerable haze there at the time, but even through this it was very brilliant, green in color, and left a bright cloud where it fell. Five minutes after the meteor's fall the cloud was still very distinct. This meteor was several times as bright as *Venus*.

Shortly before the close of our observations on the 13th, an unusually bright meteor was visible close to the southern horizon. Its course was almost vertical, which precluded its being a *Leonid*.

C. D. PERRINE.

November 17, 1898.

THE *LEONID* SHOWER IN 1898.

On the night of November 11th, a three hours' watch for *Leonids* was rewarded by only six, none of them very brilliant. Saturday night, November 12th, the sky was very clear, as on the preceding night, and the north wind, which had made the watchers very uncomfortable on Friday night, had greatly moderated its violence. Forty-one meteors were counted and charted in two hours from 13^h 45^m to 15^h 45^m P. S. T., twenty-four of which were classified as *Leonids*. Many of the others came from the constellation *Gemini*. No unusually bright meteors were noted. Sunday night, November 13th, the sky was somewhat hazy. Sixty-six meteors were charted, of which twenty-seven were counted as *Leonids*. Several of these were bright, but the only unusually brilliant meteor seen was not a *Leonid*. This one — a brilliant green in color — fell almost vertically in the south at about 16^h 25^m P. S. T., but left no smoke-cloud when it burst. The watch was continued for four hours from 12^h 30^m, Monday night, November 14th, the sky was hazy when I began to watch at 13^h 30^m P. S. T., and by 16^h the clouds had gathered too thickly to make further count possible. But in spite of this, the display of *Leonids* was far better than on preceding nights, in point of brilliancy as well as in the numbers of meteors

seen. In 140 minutes between the hours noted, 70 *Leonids* were counted, 36 of these falling in the hour from $14^h\ 25^m$ to $15^h\ 25^m$. At $13^h\ 46^m\ 45^s \pm 2^s$ P. S. T., a magnificent *Leonid* lighted up the entire sky and threw strong shadows. My attention was diverted at the instant; so I leave further description of the meteor itself to others. The train, when seen, extended a little north of the line joining δ *Leonis* and 93 *Leonis*, with a bright, bluish-white smoke-cloud near the former star. For many minutes this cloud had all the appearance of a bright naked-eye comet. Gradually it became more diffuse, and drifted toward the south into a nearly horizontal position. At $14^h\ 12^m$ it extended from δ *Leonis* toward κ *Leonis*, the southern part being the denser. It was visible for nearly forty-five minutes altogether. Another brilliant green *Leonid*, several times as bright as *Sirius*, fell at $14^h\ 37^m\ 13^s \pm 5^s$ from a point a little north of β *Leonis* toward the eastern horizon. When it burst, it left a smoke-cloud —bluish-white—that was visible even in the thick haze for at least five minutes. Several other *Leonids* with long bright trains were seen—but only the two noted left smoke-clouds.

R. G. AITKEN.

November 17, 1898.

THE *LEONIDS* IN 1898.

The *Leonids* were observed and charted at the University of the Pacific, College Park, Cal., with the following results: November 12th, 14^h to $17^h\ 30^m$ P. S. T., 75 meteors were seen within 25° of the radiant, 64 of them being classified as *Leonids;* November 13, $13^h\ 40^m$ to $17^h\ 0^m$, 45 meteors, 37 being *Leonids;* November 14, $13^h\ 45^m$ to $15^h\ 15^m$, 34 meteors, 26 being *Leonids*. Clouds stopped the observations on the 14th, and prevented work on the 15th. On the 14th a count was also made by Mr. NORMAN TITUS, a student, at his home in West Side (numbers not given). My best night was Saturday, November 12th, though it would have been surpassed by Monday, the 14th, but for the fog—the average number of *Leonids* per hour on the two nights for the time of observation being 18 and 20, respectively.

H. D. CURTIS.